

REMARKS

Reconsideration of the claims in light of the following remarks is requested. Upon entry of this amendment Claims 5 – 6, 9, 11 – 12, 14 – 20, 23 – 24 and 26 – 27 are pending and under consideration. Claims 1 – 4, 7, 8, 10, 13, 21, 22 and 25 are canceled. Claims 5, 14 and 17 are amended. Applicants respectfully submit that no new matter is added by this amendment.

Applicants have not dedicated or abandoned any unclaimed subject matter and moreover have not acquiesced to any rejections made by the Patent Office. Applicants reserve the right to pursue prosecution of any presently excluded claim embodiments in future continuation and/or divisional applications.

This amendment responds to the office action mailed June 12, 2008. In the office action the Examiner:

- rejected claims 7, 8, 21 and 22 as being indefinite under 35 U.S.C. 112, second paragraph for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention;
- rejected claims 5 and 9 under 35 U.S.C. 102(e) as allegedly anticipated by Raaijmakers et al. (US 2001/0024387) (“*Raaijmakers*”);
- rejected claims 14, 15, 20, 23 and 24 under 35 U.S.C. 102(e) as allegedly anticipated by Arkles et al. (US 2002/0119327) (“*Arkles*”);
- rejected claims 5, 6, 11 and 12 under 35 U.S.C. 103(a) as being allegedly unpatentable over Lim et al. (US 2003/0040196) (“*Lim*”) in view of *Raaijmakers* ;
- rejected claims 16, 26 and 27 under 35 U.S.C. 103(a) as being allegedly unpatentable over *Arkles* in view of *Lim* ; and
- rejected claims 17-19 under 35 U.S.C. 103(a) as being allegedly unpatentable over Yang et al. (US 6,846,516) (“*Yang*”) in view of *Lim*.

Applicants respectfully traverse and submit that the amended claims are patentable over the cited references.

Claim Amendments

Claims 5, 14 and 17 have been amended to recite a particular formula for the silicon organic precursor. Claims 5, 14 and 17 have been further amended to clarify that “N” is nitrogen to address the rejection made under 35 U.S.C. 112, second paragraph.

Support for the amendment to the claims is found in the specification and the original claims, and Applicants respectfully submit that no new matter is added.

Claim Rejections - 35 U.S.C. § 102

The Examiner rejects certain of the claims under 35 U.S.C. § 102 (e) as summarized above. Applicants respectfully traverse and submit that the claims are patentable over the cited references.

For an anticipation rejection under 35 U.S.C. § 102 to be proper, a single reference must disclose each and every element of a claim. In re Paulsen, 31 USPQ2d 1671, 1673 (Fed. Cir. 1994); M.P.E.P. § 2131.

Raaijmakers is directed to a method of forming conformal thin films over textured capacitor electrodes. *Raaijmakers* does not disclose a silicon organic precursor having the formula of: $\text{Si}(\text{NR}^1\text{R}^2)_{4-w}\text{L}_w$ or $\text{Si}_2(\text{NR}^1\text{R}^2)_{6-z}\text{L}_z$, and where R^1 and R^2 are, independently, selected from the group consisting of hydrogen, $\text{C}_1\text{-C}_6$ alkyl, $\text{C}_5\text{-C}_6$ cyclic alkyls, halogen, and substituted alkyls and cyclic alkyls, where N is nitrogen, where w equals 1, 2, 3 or 4, where z equals 1, 2, 3, 4, 5 or 6, and where L is selected from the group consisting of hydrogen or halogen, as recited in the amended claims.

Thus, *Raaijmakers* does not teach each and every element of the pending claims and Applicants respectfully request that the rejections to claims 5 and 9 be withdrawn.

Similarly, *Arkles* does not teach each and every element of the pending claims. *Arkles* is directed to chemical vapor deposition, not atomic layer deposition as recited in the pending claims. Chemical vapor deposition (CVD) and atomic layer deposition (ALD) are fundamentally different processes. ALD is performed in a cyclic fashion with sequential alternating pulses of precursor, reactant and purge gas. Even in present claims 17 and 19, the precursor and reactant gases are conveyed in sequential and alternative pulses. The ALD precursor has a self-limiting effect such that the precursor is adsorbed on the substrate up to

monolayer. Because of the self-limiting effect, only one monolayer or sub-monolayer is deposited per operation cycle, and additional precursor will not be deposited on the formed layer even when excess precursor is supplied. In contrast, in CVD the precursor and reactants arrive at the substrate simultaneously with film growth resulting from continuous chemical reactions of precursors on the substrate surface. Uniform and reproducible growth of the film during CVD is dependent on maintenance of the correct precursor and reactant flux at the substrate. The growth rate is proportional to the precursor flux at the substrate and the substrate temperature. In *Arkles* the deposition process is performed simultaneously since that is the nature of CVD.

Thus, *Arkles* does not teach each and every element of the pending claims. Applicants respectfully request that the rejections to claims 14, 15, 20, 23 and 24 be withdrawn.

Claim Rejections - 35 U.S.C. § 103

The Examiner rejects certain of the claims under 35 U.S.C. § 103 (a) as summarized above. Applicants respectfully traverse and submit that amended claims are patentable over the cited references.

The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, and (3) the level of skill in the art. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966); see also *KSR Int'l Co. V. Teleflex Inc.*, 127 S.Ct. 1727, 1734 (2007). “Section 103 forbids issuance of a patent when the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR*, 127 S.Ct. at 1734 (internal quotations omitted).

The Examiner rejects claims 5, 6, 11 and 12 under 35 U.S.C. 103(a) over *Lim* in view of *Raaijmakers*. Applicants respectfully traverse. As stated above *Raaijmakers* does not disclose the amended claims. *Lim* adds nothing more.

As the Examiner points out, *Lim* does not teach the recited temperature range. Applicants respectfully submit that it is not obvious to use the precursors recited in *Lim* in the temperature range cited in *Raaijmakers*. As discussed above, precursor chemistry in ALD

processing is complicated and different processes or applications have different precursor requirements. Even different types of deposition systems and equipment will require different process conditions and/or precursor chemistry. It is not a simple matter to substitute one chemical precursor for another. Many variables must be considered. For example, in some situations a precursor may be useful at one temperature but not viable at a different process temperature. It is not trivial or obvious to select a precursor for an ALD method. Significant development and experimentation is required to achieve a method that produces desirable films.

The Examiner states that there is motivation to arrive at a temperature range of 150 °C to 350 °C, the motivation being to achieve fast deposition while conserving thermal budgets. Applicants would like to point out that these two principals are typically at odds, and that often deposition will not occur at all, or at least not at any reasonable speed, at the lower recited temperatures. Again, the precursor chemistry is complex, and it is not obvious to substitute one precursor for another.

For at least these reasons, *Raaijmakers* and *Lim*, either alone or in combination, fail to teach each and every limitation of the claimed invention.

The Examiner also rejects claims 16, 26 and 27 over *Arkles* in view of *Lim*. Applicants traverse. As stated above *Arkles* is not directed to an ALD process. The reaction mechanisms of ALD and CVD are distinct. Many useful CVD precursors are not viable as ALD precursors, and it is not trivial or obvious to select a precursor for an ALD method. Thus, it is not obvious to combine the teaching of *Arkles* and *Lim*. Moreover, Applicants submit that *Arkles* and *Lim*, either alone or in combination, fail to teach each and every limitation of the claimed invention.

The Examiner further rejects claims 17 – 19 over *Yang* in view of *Lim*. Applicants respectfully traverse and submit that *Yang* adds nothing more. As the Examiner states *Yang* does not teach a silicon organic precursor as recited in the present claims. Again, Applicants submit that it is not trivial or obvious to select a precursor for an ALD method, and significant development and experimentation is required to achieve a method that produces desirable films. As such, it is not obvious to combine the teachings of *Yang* and *Lim*. Moreover, even if one were to combine the references, one would not arrive at the amended claims.

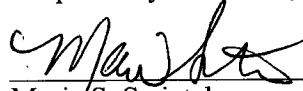
Conclusion

In light of the above amendments and remarks, the Applicant respectfully requests that the Examiner reconsider this application with a view towards allowance. The Examiner is invited to call the undersigned attorney at (650) 843-4000, if a telephone call could resolve any remaining items.

The Commissioner is hereby authorized to charge any required fee(s) to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 067538-5172-US).

Respectfully submitted,

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